

BIOLUMINESCENCE IN THE MARINE OSTRACOD
CYPRIDINA AMERICANA (MÜLLER, 1890)
OFF MANZANILLO, MEXICO
(MYODOCOPA: CYPRIDININAE)

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Abstract.—A myodocopid ostracod, *Cypridina americana* (Müller, 1890), found in coastal waters off Manzanillo, Mexico, was observed to be bioluminescent. Collection of this ostracod extends the known geographic distribution of this little-studied species and documents the only observation of bioluminescence in a species of *Cypridina* found in Eastern Pacific coastal waters.

Marine ostracods create spectacular bioluminescent displays in the world's oceans (Haneda 1940; Harvey 1952; Turner 1965; Tett and Kelly 1973). Specifically, luminescence has been observed in five species of *Vargula* (Kornicker and King 1965; Seliger and McElroy 1965; Shimomura *et al.* 1969; Raymond and DeVries 1976; Kornicker and Baker 1977; Morin and Bermingham 1980), one species of *Pyrocypris* (Tett and Kelly 1973), 22 species of *Conchoecia* (Rudjakov 1967; Angel 1968), and two species of *Cypridina* (Haneda 1940, 1953; Tsuji *et al.* 1970).

During the Varifront III cruise (16 Nov to 16 Dec 1981) into the Gulf of California, a third species of *Cypridina* was observed to be bioluminescent. The details of this observation are reported herein.

A plankton net (35 μm mesh, 1 m long) was towed at the sea surface from the USNS *DeSteiguer* at approximately two knots for 15 minutes on 27 November, 1800 hrs (GMT 331, 0100 hrs) at 19°23.8'N, 105°18.9'W, one hour prior to sunset. The sample was diluted with freshly filtered (0.45 μm) seawater for isolation of organisms and subsequent observation of bioluminescence. Only two ostracods, both actively swimming, were found within the entire collection. After several washings, each was placed into an individual vial. One of the two specimens, an adult male, was identified as *Cypridina americana* (Müller, 1890) by Dr. Louis S. Kornicker and Anne C. Cohen of the Smithsonian Institution and is deposited in the U.S. National Museum (USNM 159080).

Three hours following isolation of the ostracods, the vials were inadvertently jarred and a point of blue light was immediately observed within each ostracod. A second jarring of the vials produced an intense and persistent blue luminous cloud from each. Within the clouds were points of light that persisted for at least one minute. Subsequent jarring of the ostracods produced only brief and sometimes delayed flashes observable for only several seconds. The source of the discharged luminous clouds from these ostracods was not investigated although the mechanism for light production in the ostracod *Vargula hilgendorffii* (Müller, 1890) has been well documented (Harvey 1916, 1952).

Müller (1890) described *Cypridina americana* from specimens collected off the west coast of Colombia and Ecuador at 5°N 82°W, 3°N 85°W, and 3°S 81°W. *Cypridina americana* was reportedly found off Hawaii (Sharpe 1908) but Müller

(1912) identified the specimen as *Cypridina sharpei*. Other than Müller's (1890) description of *C. americana*, no other reports were found in the literature (personal communication, L. S. Kornicker). Collection of this ostracod off Manzanillo, Mexico extends the known geographic distribution of this little studied species and also documents the only observation of bioluminescence in a species of *Cypridina* in Eastern Pacific coastal waters.

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Literature Cited

- Angel, M. V. 1968. Bioluminescence in planktonic halocyprid ostracods.—*Journal of the Marine Biological Association, United Kingdom* 48:255–257.
- Haneda, Y. 1940. Phenomenon of bioluminescence.—*Seirigaku-Shidoshu* 5:18–31.
- . 1953. Observation on some marine luminous organisms of Hachijo Island, Japan.—*Recent Oceanographic Works of Japan* 1:103–108.
- Harvey, E. N. 1916. The mechanism of light production in animals.—*Science* 44:208–209.
- . 1952. Bioluminescence. Academic Press, New York, 649 pp.
- Kornicker, L. S., and C. E. King. 1965. A new species of luminescent Ostracoda from Jamaica, West Indies.—*Micropaleontology* 11(1):105–110.
- , and J. H. Baker. 1977. *Vargula tsujii*, a new species of Ostracoda from Lower and southern California (Myodocopa: Cypridininae).—*Proceedings of the Biological Society of Washington* 90(2):218–231.
- Morin, J. G., and E. L. Bermingham. 1980. Bioluminescent patterns in a tropical ostracod.—*American Zoologist* 20:851 (Abstract).
- Müller, G. W. 1890. Neue Cypridiniden.—*Zoologische Jahrbücher, Abteilungen für Systematik* 5(2): 211–252.
- . 1912. Ostracoda.—*Das Tierreich* 31:1–434.
- Raymond, J. A., and A. L. DeVries. 1976. Bioluminescence in McMurdo Sound, Antarctica.—*Limnology and Oceanography* 21:599–602.
- Rudjakov, J. A. 1967. The study of the luminescence of pelagic ostracoda. Pp. 52–62, *in*: Bioenergetics and biological spectrophotometry.—Moscow: Nauka.
- Seliger, H. H., and W. D. McElroy. 1965. Light: Physical and biological action.—Academic Press, New York, 417 pp.
- Sharpe, R. W. 1908. A further report on the Ostracoda of the United States National Museum.—*Proceedings of the U.S. National Museum* 35 (1651):399–430.
- Shimomura, O., F. H. Johnson, and T. Masugi. 1969. *Cypridina* bioluminescence: Light emitting oxyluciferin-luciferase complex.—*Science* 164:1299–1300.
- Tett, P. B., and M. G. Kelly. 1973. Marine bioluminescence.—*Oceanography and Marine Biology Annual Review* 11:89–173.
- Tsuji, F. I., R. V. Lynch, III, and Y. Haneda. 1970. Studies on the bioluminescence of the marine ostracod crustacean *Cypridina serrata*.—*Biological Bulletin* 139:386–401.
- Turner, R. J. 1965. Notes on the nature and occurrence of marine bioluminescent phenomena.—N.I.O. Internal Report, No. 134, 30 pp.

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